

**REMARKS**

Claims 1-26 are all the claims presently pending in the application. Various claims have been amended to better comply with local practice.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicant specifically states that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Applicant gratefully acknowledges that claims 12 and 17 would be allowable if rewritten in independent form. However, Applicant respectfully submits that all of the claims are allowable.

Claims 6-8 and 13 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite.

Claims 1-11, 14-16, and 18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ellens, et al. (U.S. Patent No. 6,670,748). Claims 19, 21, 23, and 25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ellens, et al., in view of Lebens, et al. (U.S. Patent No. 6,095,661). Claims 20, 22, 24, and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ellens, et al., in view of Lebens, et al.

These rejections are respectfully traversed in the following discussion.

**I. THE CLAIMED INVENTION**

The claimed invention, as exemplarily defined by claim 1, is directed to a light emitting apparatus including a light emitting element with an emission wavelength in the range of 360 to 550 nm and a rare-earth element doped oxide nitride phosphor. The part of light radiated from the light emitting element is wavelength-converted by the phosphor.

As discussed beginning at line 19 of page 1 and more particularly beginning at line 15 on page 4, the present inventors have recognized that conventional methods of mixing LED lights to obtain colors have problems with specific colors such as red or white.

The claimed invention, on the other hand, as explained at lines 1-6 of page 5, provides

a combination of elements that improve these problems specifically for red and white.

## II. THE 35 USC §112, SECOND PARAGRAPH REJECTION

Claims 6-8 and 13 stand rejected under 35 U.S.C. §112, second paragraph.

More specifically, the Examiner alleges that claim 6 is indefinite because of "... the entirely undefined and undetermined ranges for at least one of the variables, x, y, z, m and n, rendering the claim limitations of lines 3-10 of claim 6 implausible. See MPEP §2172.01."

In response, Applicants respectfully direct the Examiner's attention to MPEP §2173.05(t), wherein it is pointed out: "*Claims to chemical compounds and compositions containing chemical compounds often use formulas that depict the chemical structure of the compound. These structures should not be considered indefinite nor speculative in the absence of evidence that the assigned formula is in error. ...A claim to a chemical compound is not indefinite merely because a structure is not presented or because a partial structure is presented. ... Chemical compounds may be claimed by a name that adequately describes the material to one skilled in the art.*"

Applicants submit that the general formula would be well understood by one of ordinary skill in the art, and the above recitations from MPEP §2173.05(t) demonstrate that there is no basis for indefiniteness in a chemical formula that leaves open a precise range of parameter values.

Relative to the rejection for claim 13, Applicants are uncertain as to what "brackets" the Examiner is referring, since there are no brackets. The parentheses are clearly part of the chemical formula and the "<" symbols are not brackets, but rather the mathematical symbol for "less than", and these symbols are used to define a range of the respective parameters.

Therefore, pending clarification by the Examiner, Applicants make no change to claim 13 at this time.

In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw these two rejections for indefiniteness.

## III. THE PRIOR ART REJECTIONS

The Examiner alleges that Ellens teaches the present invention defined by claims 1-11

and 14-16 and, when modified by Lebens, renders obvious claims 19-26. Applicant submits, however, that there are elements of the claimed invention which are neither taught nor suggested by Ellens.

More specifically, the Examiner considers that Ellens renders obvious claims 1, 3, and 14. Applicants respectfully disagree.

The Examiner recognizes that Ellens teaches using phosphors having peak emissions at 430 to 670 nm but considers that this broader range of wavelengths renders the present invention obvious, since, as alleged by the Examiner: “*...obviousness typically exists when the ranges as claimed overlap the ranges disclosed in the prior art or when the ranges do not overlap but are close enough such that one skilled in the art would have expected them to have the same properties.*”

Although Applicants can agree with the Examiner’s statement from *In re Peterson*, Applicants submit that the facts have not been properly applied in the present evaluation. More specifically, since light mixing is additive, the broader range of wavelengths in Ellens clearly reflects the above-described problem discussed in the background section of the present Application. That is, this broader range of wavelengths provide the problems with specific colors such as red and white light.

In contrast, Applicants have recognized that the narrower range of wavelengths defined in independent claims 1 and 14, in combination with the remaining claim limitations, provide an improvement in these specific colors. Applicants submit that Ellens cannot reasonably be considered as recognizing the criticality of this narrower range of wavelengths.

As stated in MPEP §2141.02: “[A] patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified. This is part of the ‘subject matter as a whole’ which should always be considered in determining the obviousness of an invention under 35 U.S.C. §103.”

As explained below in the discussion for various defendant claims, Ellens fails to teach or suggest the three specific phosphors exemplarily used in the present invention from which is derived this narrower wavelength range.

Because Ellens is not aware of this narrower wavelength range, it cannot be reasonably alleged that the significance of this narrower range was known in Ellens as critical for overcoming the problems identified by the present inventors for achieving red and white

colors.

That is, as clearly stated in MPEP §2144.05 II.B: “*A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation.*”

Applicants submit that Ellens reasonably provides no indication of the beneficial effect on the specific colors red and white of the narrower range defined in claims 1 and 14. The Examiner relies upon Lebens for demonstrating an entirely different aspect of the present invention, so that Lebens clearly fails to overcome this basic deficiency of Ellens.

Hence, turning to the clear language of the claims, in Ellens there is no teaching or suggestion of: “...a light emitting element with an emission wavelength in a range of 360 to 550 nm ....”, as required by independent claim 1. Independent claim 14 has similar language.

Therefore, Applicant submits that there are elements of the claimed invention that are not taught or suggest by Ellens, and the Examiner is respectfully requested to withdraw this rejection.

Relative to the rejection for claim 6 and the first of the three exemplary phosphors, as discussed beginning at line 8 of page 18, Applicants submit that the Examiner’s initial burden has not been satisfied. That is, although the first portion of the formula, the broader aspect of the formula (e.g.,  $Me_xSi_{12-(m+n)}Al_{(m+n)}O_nN_{16-n}$ ), has arguably been described in Ellens, there is no suggestion therein that the narrower definition of this formula has been enabled (e.g., “...  $Re_1yRe_2z$ , part or all of metal (Me), where Me is one or more of Li, Ca, Mg, Y and lanthanide metals except for La and Ce, to be dissolved into  $\alpha$ -sialon being replaced by lanthanide metal (Re1), where Re1 comprises one or more of Ce, Pr, Eu, Tb, Yb and Er, as a luminescence center, or replaced by lanthanide metal (Re1) and lanthanide metal (Re2), where Re2 comprises Dy, a co-activator”).

Relative to the second exemplary phosphor, discussed beginning at line 3 of page 23 and described in claim 12, the Examiner concedes that this embodiment is allowable.

Relative to the third exemplary phosphor, discussed beginning at the final line on page 26 and described in claim 15, the Examiner points to line 64 of column 2, wherein is recited “ $LaSi_3N_5:Ce$ ”, with the Examiner adding the limitation “...with  $x = 0.5$ .“

However, Applicants submit that the claim clearly describes “... $La_{1-x}Si_3N_5:xCe$ , where

doping amount x is  $0 < x < 1 \dots$ " Therefore, if  $x = 0.5$ , as added by the Examiner the equation of the claim becomes " $\text{La}_{0.5}\text{Si}_3\text{N}_5:0.5\text{Ce}$ , where doping amount x is 0.5." This formula is not the formula at line 64 of column 2 upon which the Examiner relies.

Therefore, Applicants submit that, contrary to the allegation of the Examiner, Ellens fails to teach or suggest the three exemplary phosphors used in the present invention to achieve the narrower wavelength defined in generic claims 1 and 14.

For this reason alone, the present invention is clearly patentable over Ellens.

Relative to the rejection based on Lebens (e.g., claims 19-26), Applicants submit that the present invention uses the controlled intermittent operation of the light emitting source in combination with mixing colors by using phosphors. Applicants submit that this is a different concept from that of selectively controlling each of a plurality of different-colored LEDs, as is done in Lebens.

That is, as explained beginning at line 19 of page 29, the present invention selectively turns on the light emitting element intermittently, so that the light emitting element and the light radiated by the phosphor is taken out in time division, thereby mixing the lights in different portions and adjusting the color of the perceived light.

Lebens fails to use a phosphor in its LEDs and, therefore, clearly fails to control color mixing by selectively changing the ratio of time for light emission from the light source *vis a vis* the phosphor emission.

Because of this basic difference in the principle of operation, Lebens clearly fails to teach the claimed invention defined in claims 19-26, even if Lebens were to be combined with Ellens.

Therefore, Applicant submits that there are elements of the claimed invention that are not taught or suggest by Lebens. Therefore, the Examiner is respectfully requested to withdraw this rejection.

#### **IV. FORMAL MATTERS AND CONCLUSION**

In view of the foregoing, Applicant submits that claims 1-26, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance.

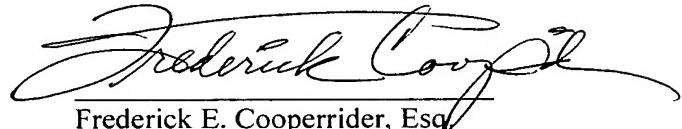
The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

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